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Original Research

Alcohol purchasing by ill heavy drinkers; cheap alcohol is no single commodity

J. Gill [a,*], J. Chick [a], H. Black [a], C. Rees [b], F. O'May [b], R. Rush [b], B.A. McPake [b]

[a] School of Nursing and Midwifery, Napier University, Edinburgh, EH11 4BN, UK
[b] School of Health Sciences, Queen Margaret University, Edinburgh, EH21 6UU, Scotland, UK

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ABSTRACT

Objectives: Potential strategies to address alcohol misuse remain contentious. We aim to characterise the drink purchases of one population group: heavy drinkers in contact with Scottish health services. We contrast our findings with national sales data and explore the impact of socio-economic status on purchasing behaviour.

Study design: Cross-sectional study comparing alcohol purchasing and consumption by heavy drinkers in Edinburgh and Glasgow during 2012.

Methods: 639 patients with serious health problems linked to alcohol (recruited within NHS hospital clinics (in- and out-patient settings) 345 in Glasgow, 294 in Edinburgh) responded to a questionnaire documenting demographic data and last week's or a 'typical' weekly consumption (type, brand, volume, price, place of purchase). Scottish Index of Multiple Deprivation quintile was derived as proxy of sociodemographic status.

Results: Median consumption was 184.8 (IQR = 162.2) UK units/week paying a mean of 39.7 pence per alcohol unit (£0.397). Off-sales accounted for 95% of purchases with 85% of those <50 pence (£0.5 UK) per alcohol unit. Corresponding figures for the Scottish population are 69% and 60%. The most popular low-priced drinks were white cider, beer and vodka with the most common off-sales outlet being the corner shop, despite supermarkets offering cheaper options. Consumption levels of the cheapest drink (white cider) were similar across all quintiles apart from the least deprived.

Conclusions: Heavy drinkers from all quintiles purchase the majority of their drinks from off-sale settings seeking the cheapest drinks, often favouring local suppliers. While beer was popular, recent legislation impacting on the sale of multibuys may prevent the heaviest drinkers benefiting from the lower beer prices available in supermarkets. Nonetheless, drinkers were able to offset higher unit prices with cheaper drink types and maintain high levels of consumption. Whilst price is key, heavy drinkers are influenced by other factors and adapt their purchasing as necessary.

* *Corresponding author*. Tel.: +44 0131 455 5301.
E-mail address: j.gill@napier.ac.uk (J. Gill).

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Introduction

Globally, alcohol is estimated to be the third highest risk factor for disease and disability.[1] The societal cost of alcohol in the UK has been estimated at £21 billion annually[2] and both central and regional governments promote their commitment to addressing the negative consequences of alcohol misuse.

UK regional differences in relation to alcohol consumption are noteworthy; adult sales of pure alcohol in Scotland are one fifth higher than in England and Wales, with this difference being ascribed particularly to sales of cheaper sprits such as vodka.[3] In 2011, alcohol-related death rates amongst Scottish men were 1.8 times those of their counterparts in England (28/100,000 population compared to 16/100,000 population), for women the ratio was 1.75 (14/100,000 population compared to 8/100,000 population).[3] In 2006, alcohol-related death rates amongst Scottish women actually exceeded those of men in England and Wales.[4]

The Scottish Government's response has been multifaceted through proposals linked to policy and legislation.[5] An important example of the latter has been the Alcohol Minimum Pricing Act[6] passed by the Scottish Parliament in 2012 which intends to set a minimum unit price (MUP) for all alcohol sold in Scotland. (One UK alcohol unit is 8 g or 10 ml of ethanol.) It is anticipated, initially, that this will be sold at no less than 50 pence per unit (ppu), (£0.5 or $0.85 US). Currently this proposal is subject to legal challenge and the implementation date remains uncertain (as of April 2015).

In 2008–09 we conducted research amongst a group of drinkers likely to be acutely affected by the introduction of a MUP. These drinkers were patients with serious alcohol-related problems (n = 377), recruited at hospital settings within Scotland's capital city. Mean consumption for the recorded week was 197.7 UK units, with ~90% purchased in 'off-sales' settings (alcohol purchases from independent shops, supermarkets etc and intended for consumption off the premises) and 82.3% of units being sold at or below 50 ppu. The most popular drink was vodka, accounting for 28.6% of all units purchased (more than double the proportion purchased by the general population) while white cider, purchased relatively rarely by the general population accounted for 16.0% of all units purchased and commanded the lowest mean unit price, 15 ppu.[7] (Note that 'on-sales' refer to alcohol sold for consumption on the premises e.g. in pubs, restaurants, hotels.)

Since this work the Alcohol etc. (Scotland) Act 2010,[8] implemented in October 2011, has instigated a variety of changes affecting the sale of alcohol in Scotland including a ban on quantity discounts for off-sales purchases (e.g. six bottles of wine for the price of five) and restrictions on alcohol displays and promotions in off-sale settings.

The Scottish Government also appointed NHS (National Health Service) Health Scotland to contribute to the evaluation of key components of its alcohol policy by monitoring price and consumption using three data sources; sales data (on and off-sales), self-report surveys and alcohol duty clearances produced by the UK revenue and customs (HMRC). Their analysis and subsequent description of the sale of alcohol to the Scottish population are now reported annually (MESAS - Monitoring and Evaluating Scotland's Alcohol Strategy)[3,9] providing detail relating to sales of different drink types.

This report extends our previous 2008 work (conducted across one year 2008–09).[7] Using identical recruitment procedures we have contrasted self-reported consumption among heavy drinkers in 2012 in Edinburgh with the detailed analysis of the Scottish population consumption descriptors provided by the MESAS reports. We have also extended recruitment to include heavy drinkers living in Scotland's largest city, Glasgow. Together, Edinburgh and Glasgow account for approximately one third of the population of Scotland.

We aim to:

1. Describe consumption levels, drink choices, price paid and place of purchase for a sample of the heaviest consumers of alcohol in medical contact in two Scottish cities during 2012;
2. Compare prices paid by participants and their drink choices with Scottish population data published by MESAS from analysis of sales data during the same time period (2012);
3. Contrast the consumption patterns of our sample following stratification according to deprivation index.

Methods

Participants and procedures

Consecutive patients whose health had been harmed by alcohol consumption were approached by clinicians for permission to be interviewed at NHS settings within two Scottish cities between December 2011 and October 2012. Some were attending as out-patients at alcohol treatment clinics or as inpatients at detoxification and assessment wards, while others were admitted to medical and/or surgical services and subsequently referred to the Alcohol Liaison Service. Site-specific interviewers were responsible for describing the study in more detail, obtaining consent and administering the questionnaire.[7] Participants were asked to recall their most recent week of drinking (or 'typical week' within the past six months) in terms of the type of drink, volumes consumed (natural volume), brands of drinks (to enable accurate recording of ABV percent), purchase price and where purchased. (In the UK 'on-trade sales' means sold on the premises of a bar, restaurant, club, pub or hotel; purchases from shops and supermarkets being termed 'off-sales'). The alcohol by volume (ABV) of each reported drink was checked from websites and using this information, total alcohol units consumed per week and price paid per UK unit (ppu) for each drink type were calculated. For beers and ciders, prices were calculated for each subtype based on ABV (7.5% and over, 5–7.4% and <5% for beer; 6% and over, and <6% for cider). Age, gender and postcode were documented, the latter acting as a proxy for socio-economic status using the Scottish Index of Multiple Deprivation (SIMD).[10] The 2012 SIMD divides Scotland into 6505 small geographical areas called datazones containing approximately 350 households identified by

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postcode. Each datazone is assigned a rank of relative deprivation based on several domains (employment, income, health, education, geographic access to services, crime and housing). We used our participants' postcodes to record the SIMD rank by quintile.

Patients were excluded: if they were under 18 years old, their last week of drinking was not typical, they could not recall a period of their typical drinking which had occurred in the past six months, were unable to read the information and consent form or unable to understand English or had significant memory impairment, due for example to Korsakov's syndrome. (Also excluded were patients being considered for liver transplant in case it impacted on the sensitive assessment and recommendation process.) Finally, patients were excluded if they did not agree to participate in three follow-up interviews conducted at six month intervals. For logistical reasons, not every patient attending the alcohol services in this period could be approached, however, data collection was continuous over the time period. Only data relating to the first interview will be reported here.

A total of 639 patients were interviewed. In addition, 89 patients identified by the clinician refused to participate prior to receiving detail relating to the study, 61 refused after this point, one refused during the interview and, in 20 cases, the researcher had concerns and terminated the interview. In total 108 male and 62 female patients (21%) of those approached did not participate.

Findings are contrasted with data relating to alcohol sales and price reported for the Scottish population sales data for 2012 by Robinson and Beeston.[9] Their published reports draw on data copyrighted to The Nielsen Company and/or CGA Strategy ('CGA', consultants providing on-trade alcohol sales data).

Descriptive statistics produced report the mean, 95% confidence intervals or median and interquartile range (IQR), for non-parametric data. For analysis of parametric data relating to independent groups the independent *t*-test and ANOVA were employed, for non-parametric data the Kruskal-Wallis test and Mann-Whitney test (with post hoc corrections). The statistical software used throughout was SPSS version 19.[11]

Results

Descriptors of alcohol consumption

Characteristics of the alcohol consumption of our heavy drinker sample are summarised in Table 1. The three most popular drinks were vodka (26.5% of all units purchased), beer (19.8%) and white cider (24.4%). Weekly consumption by males (median = 196.0 (167.5) units) was significantly higher than that of females (median = 157.6 (159.8) units) (U = 31,921.0 ($P < 0.001$). Gender differences in drink preferences are detailed in Table 2. Vodka sales accounted for the greatest proportion of units consumed by women, for males this drink was white cider. Whisky, a spirit drink traditionally associated with Scotland, accounted for only 4.8% of sales overall. Stealing alcohol was stated by five respondents, while 1.2% of all units were paid for by others, e.g. sharing of drink. Smoking was reported by 70.1% (n = 448).

Table 1 – Participant demographics and alcohol consumption (N = 639).

% male	71.7
Mean Age (years)	45.6
(95% CI)	(44.8–46.5)
Median (IQR) Consumption (typical or last week) UK units	184.8 (161.3)
Mean pence per unit for all purchased units (all outlets)[a]	39.7
% of all units purchased as OFF Sales	95.0
% of all units reported as stolen	0.49%
Median Expenditure (IQR) in recorded week (£)	70.00 (62.02)

[a] Sample total weekly expenditure divided by total units consumed in week, excludes units consumed but not paid for. (IQR = interquartile range, 95%CI = 95% confidence interval).

Table 2 – Percentage of alcohol (UK units) purchased, by drink category and gender.

	Males (N = 458)	Females (N = 181)
White cider	25.9	18.3
All beer categories (low, medium and high strength)	23.6	7.3
Vodka	22.3	40.6
Other amber ciders	9.0	8.6
Whisky	5.6	2.0
Sherry (fortified wine)	5.3	0.6
White or rosé wine	2.6	15.4
Red wine	0.9	1.8

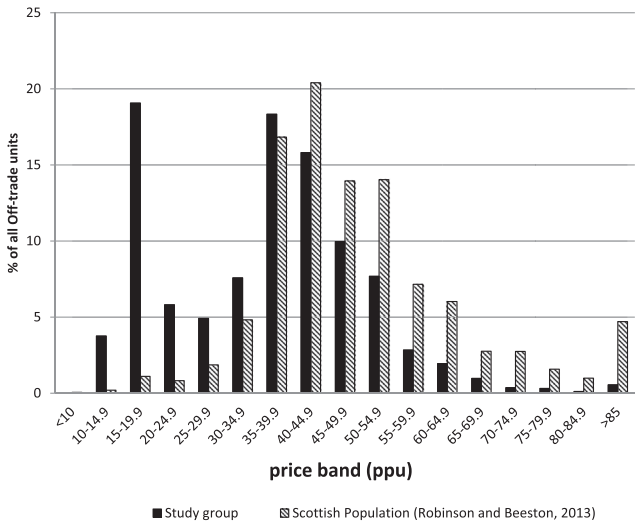

Fig. 1 – Price distribution (%) of all drinks purchased as 'off-sale' by study group (data collected 2012). For comparison, population data from Robinson and Beeston[9] (MESAS), produced from the Nielsen off-trade dataset (excluding discount retailers) are shown (% of all off-trade alcohol (L pure alcohol)) and sold in Scotland during 2012.

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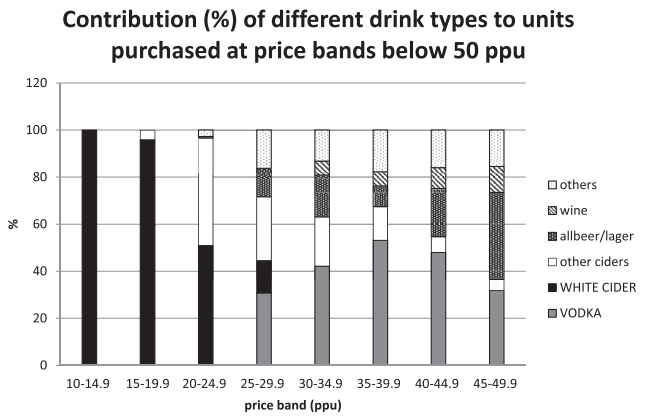

Fig. 2 – Contribution (%) of different drink types to units purchased at price bands below 50 pence per unit (ppu).

Off-sales accounted for 95% of sales, of which 85.2% of units were purchased at a price of <50 pence per UK unit (ppu).

Fig. 1 provides a comparison between the distribution of price per UK unit for all drinks bought by participants in off-sale outlets and MESAS data relating to the price distribution of alcohol sold through off-sales to the general population in Scotland (also in 2012).[9] In the latter case the largest proportions of UK units were sold at 35–39.9 ppu and 40–44.9 ppu. In contrast our participants purchased the largest proportions of their drinks within the 35–39.9 ppu and 15–19.9 ppu price bands.

Fig. 2 illustrates participants' drink choices at price bands below 50 ppu, white cider, vodka and amber ciders were key contributors to low cost sales.

Individual drinks

Vodka

Vodka (any) was consumed by 37.9% of participants (50.3% of females but only 33.0% of males).

The proportion of vodka purchases in the different price bands (off-sales only) is shown in Fig. 3 and contrasted with the MESAS Scottish population sales data.[9] Our participants purchased 53.6% of their vodka units below 40 ppu, for the wider Scottish population this figure was 29%.[9] Vodka accounted for 26.7% of all units consumed (off and on-sales) with a median unit off-sale price of 41.0 ppu (10).

Cider

Cider consumption comprised white, amber and pear varieties. The majority (70%) was white cider and this drink accounted for 96.6% of all sales under 20 ppu. In Fig. 4 the distribution of unit prices for white, amber and pear ciders (combined) is contrasted with Scottish population data reported by Robinson and Beeston.[9] (Both data sets refer to 2012.)

Beer and lager

For beer and lager the distribution of unit prices paid by our heavy drinkers in 2012 is compared with those reported for Scottish off-sales in Fig. 5.

The highest proportion of beer sales for our 2012 sample was actually above 50 ppu, within the 50–54.9 price band. Compared to the general population, our drinkers purchase proportionally more beer at the higher price bands between 40 and 59.9 ppu.

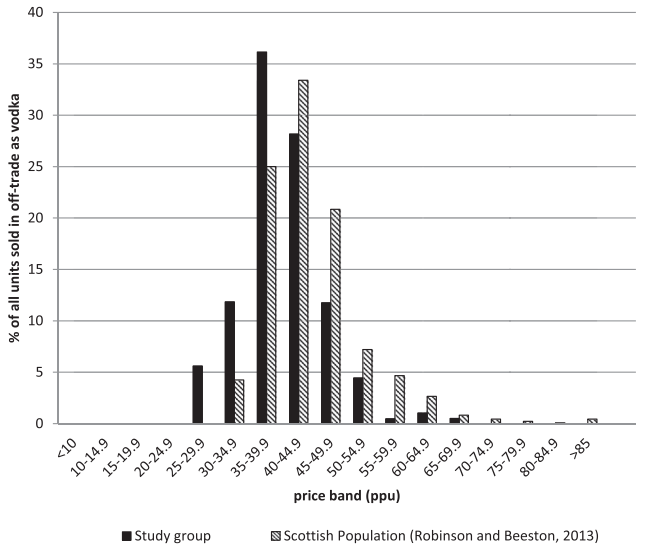

Fig. 3 – Price distribution of units purchased off trade as vodka by study group (data collected 2012). For comparison, data from Robinson and Beeston[9] produced from the Nielsen off-trade dataset (excluding discount retailers) are shown (% of all off-trade vodka (L pure alcohol)) and sold in Scotland during 2012.

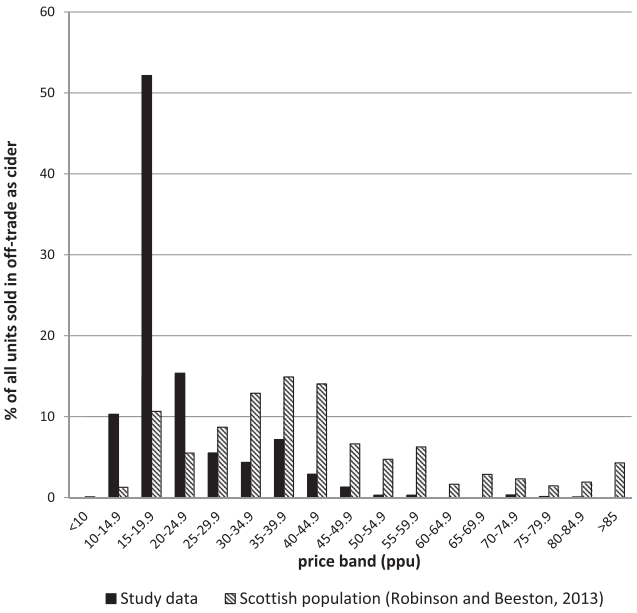

Fig. 4 – Price distribution of units purchased off trade as cider (white, amber and pear ciders) by study group. For comparison data from Robinson and Beeston[9] produced from the Nielsen off-trade dataset (excluding discount retailers) are shown (% of all off-trade cider (L pure alcohol)) and sold in Scotland during 2012.

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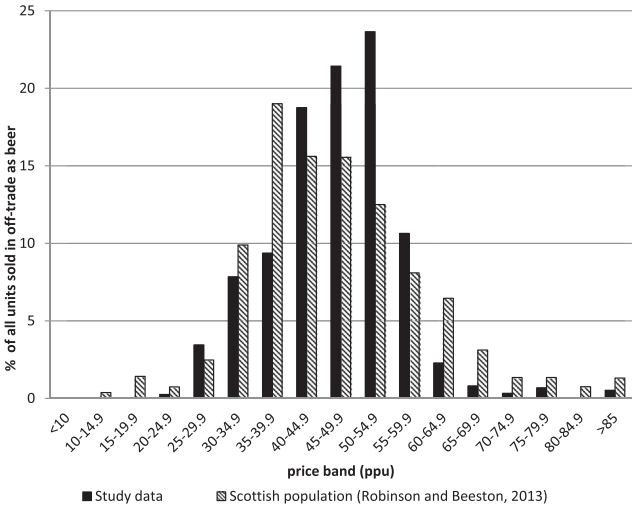

Fig. 5 – Price distribution of units purchased off trade as beer. For comparison, data from Robinson and Beeston[9] produced from the Nielsen off-trade dataset (excluding discount retailers) are shown (% of all off-trade beer (L pure alcohol)) and sold in Scotland during 2012.

Place of purchase

For all alcohol sales, 5% were on-sales, 34.4% of all units were purchased from supermarkets with 48.9% from corner shops, 8.5% from off licences (3.2% other outlets e.g. petrol stations).

For white cider, 100% of units were purchased off-sales with the majority of these, 73.1%, being purchased from corner shops. However, those who purchased their white cider exclusively in supermarkets paid significantly less (median = 15.0 ppu) than those who purchased only from corner shops off licences (median = 18.0 ppu), (U = 916.0, $P = 0.008$).

For vodka, 96.9% of all units were purchased from off-sale outlets, and again corner shops accounted for the majority (48%) of these sales (supermarkets accounted for 36.6% of sales). The median unit price paid by those who purchased all their vodka from supermarkets (n = 79) was 40.0 ppu (7.0) and was identical to that paid by those who purchased only at corner shops or off licences (n = 123).

For beer, the percentage of all units (82.4%) purchased as off-sales was slightly lower than the percentages of vodka and white cider that were purchased off sale (see above). Corner shops accounted for 54.5% of all beer off-sales, supermarkets for 33.8%, and off licences, 11.3%. Super strength (Alcohol by Volume (ABV) > 7.5%) accounted for 20.1% of beer off-sales and the median price (44 ppu) was identical in supermarkets, corner shops and off licences. For medium strength beer (ABV 5–7.4%), 27.3% of beer off sales, the median price was lowest in supermarkets (45.0 ppu) when compared to corner shops, 48.0 ppu, (U = 351.5; $P = 0.655$) and other off licenses, 48.0 ppu, (U = 113.5; $P = 0.259$). For low strength beer (<5% ABV) (the most popular beer at 52.7% of off-sales), the median price was significantly lower in supermarkets (44 ppu) when compared to corner shops, 51.0 ppu, (U = 838; $P < 0.001$) and off licences, 50 ppu, (U = 159; $P = 0.001$). Despite offering cheaper prices for the most popular beer type, supermarkets accounted for only 37.8% of low strength beer sales.

Consumption pattern by quintile of deprivation

Using postcodes we derived the Scottish Index of Multiple Deprivation (SIMD)[10] rank for each of our drinkers as a proxy for socio-economic status. The consumption pattern of each quintile is summarised in (see Tables 3 and 4). The male:female ratio in quintile 1 was 3:1, in quintile five it was approximately 2:1 (see Table 3).

Age was not significantly different between quintiles. Quintile 1 accounted for the majority of participants (47%) and contained the highest proportion of drinkers purchasing exclusively from off-sales.

Quintile 3 was characterized by the highest mean consumption and the highest percentage of units purchased in on-sale settings, the lowest percentage of drinkers purchasing exclusively from off-sale outlets and the highest expenditure for the recorded drinking week. (The mean unit price for off-sale purchases was £0.40, £1.20 for on-sale purchases.)

White cider, the cheapest drink available in off-sales accounted for approximately one quarter of the consumption of each quintile apart from quintile 5 (least deprived) who drank proportionately less white cider (Table 3) but proportionally more vodka.

Discussion

Amongst this sample of heavy drinkers the median weekly consumption was 185 UK units, in sharp contrast to the figure of 21 UK units reported for each Scottish adult aged 16 years or over in 2012.[9] Using the proposed minimum unit price of alcohol, 50 ppu, as a benchmark, our drinkers purchased at the lower end of the price range in off-sale settings; 90% of spirit, 60% of wine and 99% of cider units were purchased below 50 ppu. The corresponding Scottish population data are; 72%, 44% and 75% respectively.[3]

As before we report a gender difference with males consuming significantly more units per week than females.[7] This difference was not recorded by Sheron et al. from a study of 404 patients attending a liver clinic (out and in patients in an English city – mean weekly consumption 145 UK units).[12] When we investigated a sub-group of our drinkers self-reporting liver disease (n = 138) there was also no significant gender difference. Median unit consumption in the recorded week was 190.82 (194.32) for males (n = 102) and 182.95 (151.47) for females (n = 36) (U = 1460.00, $P = 0.068$).

Off-sales to our drinkers accounted for 95% of units purchased; in Scotland as a whole, of the total volume of alcohol sold in 2012, 69% was through off-sales.[3] Collectively three drinks (vodka, white cider and beer) accounted for over 70% of sales; a finding consistent with that of Sheron et al.[12] Ciders dominated the cheapest off-sale options (median white cider price was 17 ppu) and accounted for one third of drinks consumed (in Scotland the market share of cider is around 7%, but just 1.1% for strong varieties, which include white cider).[3]

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Table 3 – Consumption characteristics of participants stratified by SIMD quintile.

	Quintile 1 (Most deprived)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (Least deprived)	P
n	301	127	100	58	53	
% male	75.7	68.5	72	67.2	60.4	
Mean (95%CI) age (years)	44.3 (43.1–45.5)	45.9 (44.1–47.8)	47.3 (45.1–49.5)	46.2 (43.6–48.9)	48.6 (45.2–52.0)	ns
Median (IQR) week consumption (UK units)	210.00 (171.63)	172.20 (157.50)	197.75 (169.22)	153.20 (131.31)	137.69 (110.16)	1v2 $P = 0.006$ 1v3 n.s. 1v4 $P = 0.002$ 1v5 $P < 0.001$
Gender difference in consumption	$P = 0.006$ ($U = 6529.0$)	$P = 0.015$ ($U = 1270.0$)	n.s. ($U = 811.0$)	$P = 0.032$ ($U = 241.0$)	n.s. ($U = 334.0$)	
Median (IQR) unit price (pence)	39.0 (21)	38.0 (19)	43 (20)	44 (20)	42 (21)	1v5 $P < 0.015$
% drinkers purchasing all alcohol in off sales outlets	86.4	81.9	70	74.1	79.2	
Mean percent of units purchased in On sales outlets	5.4	9.2	10.7	7.3	5.6	
Median (IQR) expenditure for the recorded week (£)	74.27 (65.53)	63.00 (68.05)	86.35 (71.67)	59.74 (42.66)	56.00 (44.82)	3v1 n.s. 3v2 $P = 0.003$ 3v4 $P = 0.003$ 3v5 $P = 0.001$

The popularity of vodka is consistent with the reported preference for spirit drinking among the wider Scottish population[3]; in 2012 alcohol sales were 19% higher than in England and Wales with 57% of this country difference due to sales of spirits. Vodka is particularly popular; 2.4 times more vodka being sold within the cheaper 35–49.9 ppu price bands in Scotland than in England & Wales. Amongst our participants 76.2% of vodka was sold within these bands (with 17.5% sold even more cheaply). Our data highlight a preference for vodka spirit drinks over whisky, much more so than in the general Scottish population where whisky accounts for around 10% of off-sales, vodka 14%.[9] Despite Scotland's reputation as a major producer of whisky, the majority of production is for export.[13]

For vodka, white cider and beer, the majority of purchases were made from corner shops and off licences. For white cider and beer, supermarkets offered significantly cheaper options for each drink. Arguably the proximity of the corner shop counterbalanced the saving obtainable at the supermarket.

Another factor may be relevant and explain the relatively high median price paid for low strength beer by our sample; data relating to the Scottish population report that 65% of beer bought in off-sale settings was at a price below 50 ppu,[3] in our sample this figure was, counterintuitively, lower at 61%. We documented prices being charged by supermarkets and corner shops in Edinburgh (for a brand of low strength beer popular with our beer drinkers). Within corner shops ($n = 8$) the mean price of beer was 64.5 ppu while in supermarkets ($n = 6$) it was 41.7 ppu, (lowest price 34.1 ppu). To benefit from the latter price it was necessary to purchase a multipack of 15 or 20 cans, single cans were not available. The Alcohol etc. (Scotland) Act 2010 banned quantity discounts in off-sales but does not apply to multibuy offers if the single item is not on sale in the same store.[8] Arguably poor access to supermarkets, poor finances, or difficulties transporting the bulk of supermarket multipack offers may make cheap beer less accessible.

However some participants obtained high unit consumption at a lower unit price by offsetting the greater unit price of beer with purchases of other cheaper beverage types. This group of drinkers ($N = 85$) paid a median price of 45 ppu (50.0) for non-beer units (median consumption 137.81 (167.47)) but for their beer purchases the median price paid for <5% ABV beer was 50.0 ppu (14.0) consuming 49.28 units (90.9).

From 2008 to 2012, affordability of alcohol in the UK (calculated from the UK consumer price indices and data on real disposable household income[3] decreased by 4.7% and was attributed largely to the economic downturn (i.e. fall in disposable income). Additionally during the period 2000–2012, average off sales prices in Scotland increased by 29%.[3]

Despite this falling affordability, our 2012 Edinburgh participants, recruited identically to those in our earlier study,[7] reported a similar mean weekly consumption with little change in the average price paid (median price for all drinks - off and on-sales - increased from 37.0 to just 40.0 ppu) with no significant change in weekly expenditure. This may be explained by two trends in their purchasing towards even greater off-sale purchasing (from 91% to 95%); and a shift towards white cider, the cheapest per unit beverage (median 17 ppu), or in other words 'trading down'.

Using the Scottish Index of Multiple Deprivation Index (SIMD) (employed as a proxy for socio-economic status) we were able to stratify our sample and demonstrated the popularity of the cheapest option, white cider (7.5% ABV) across quintiles. With the exception of quintile 5 (least deprived) roughly one quarter of the number of heavy

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Table 4 – Contribution to quintile consumption made by off-sales of individual drinks.

Quintile	Proportion of total consumption due to off-sales of white cider.	Median (IQR) price of white cider. (Pence per UK unit)	Proportion of total consumption due to off-sales of vodka.	Median (IQR) price of vodka. (Pence per UK unit)	Proportion of total consumption due to off-sales of other cider.	Median (IQR) price of other cider. (Pence per UK unit)	Proportion of total consumption due to off-sales of beer.	Median (IQR) price of beer. (Pence per UK unit)
1	22.3%	18.0 (3)	21.9%	40 (10)	8.0%	28.5 (14)	18.9%	48.0 (10.0)
2	25.3%	17.0 (2)	28.9%	41 (8)	8.1%	33 (15)	14.4%	48.5 (15.5)
3	23.3%	16.0 (2)	28.6%	39 (9)	6.3%	35 (17)	14.0%	45.0 (10.0)
4	28.7%	18.0 (2)	22.7%	43.5 (8)	11.5%	34.5 (9)	9.4%	50.0 (11.3)
5	8.8%	17.0 (10)	36.5%	38 (9)	10.5%	30.5 (24)	13.2%	45.0 (9.0)

drinkers within each of the quintiles 1–4 reported purchasing white cider.

Limitations

The generalisability of these findings cannot be assured. We have not accessed the unknown number of ill, heavy drinkers not seen by services; some attending the services were too ill to be interviewed and/or not referred by staff; patients admitted and discharged over the weekend would be excluded; and some approached declined to participate. Additionally we cannot comment on the consumption patterns and expenditure of those heavy drinkers, not recruited to our study, and at an earlier stage of the trajectory which may lead later to the need for medical care. Nor can assurance be complete about accuracy of recall and honesty of reporting, although the interview took as long as required by each individual participant, allowing for time to explore ambiguities in recall with a very low rate of missing data, one of the strengths of this study. The majority of participants were adept purchasers and 'price aware' but where alcohol content or price were unclear, manufacturer and supermarket websites were checked. We cannot impute a yearly expenditure figure for our group; weeks of drinking were interspersed with periods of clinic attendance etc.

We cannot know from our design whether some potential patients would have reduced consumption with the fall in affordability and consequently not appeared in the hospitals where we were recruiting – ours was not an incidence survey. It is pertinent that there was a 16% decrease in rates of alcohol related discharges from general acute hospitals in Scotland from 828 to 693 discharges per 100,000 population in 2008/09 and 2012/13 respectively.[14] The age-standardised death rates from liver disease per 100,000 of the Scottish population (all persons), which had been rising since the 1970s also fell, from 20.6 in 2008 to 15.0 in 2012.

The SIMD has been criticised for using geographical information to infer individual circumstances, when considering densely populated urban regions as explored here, such issues are lessened.[10] A decision was made to employ a socioeconomic proxy rather than exploring the sensitive topic of participant income and expenditure so as to minimise missing data. Indeed when Sheron et al.[12] requested income data from patients with liver disease almost 30% refused to provide any information.

Implications for minimum unit pricing (MUP) as a policy to reduce harm in society from alcohol

The prime objective of the Scottish Government's MUP proposal is to reduce health and social damage related to alcohol, both by lowering consumption among heavy drinkers and reducing the recruitment of new heavy drinkers. The MUP for alcohol proposed for Scotland is 50 ppu. In 2012, 60% of all alcohol sold in the off-sales in Scotland was below this price[3]; amongst our participants, that proportion was 83.2%. Sheron et al.[12] studying patients with alcoholic liver disease, reported a figure of 75%. If cheap alcohol is removed from the market, heavy drinkers would either have to find considerably more

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money to maintain their pattern (an average of 20.6% greater expenditure), reduce their total consumption, or find other sources (e.g. theft or smuggling). Drinks admitted stolen accounted for only 0.5% of units consumed with no reports of consumption of illegally produced or smuggled alcohol within our study group. Qualitative interviews did record instances of spirits being offered for sale, but they turned out to be water substitutes. Currently, pragmatism often governs drink choice. Drink types chosen by our participants are likely to change in the event of the introduction of MUP. Based on unsolicited comments from participants, we would speculate that heavy drinkers may be unwilling to pay a new high unit price (50 ppu) for some drink types, perceived by them as poor quality. Undoubtedly the higher prevalence in our sample of those in the most deprived category may in part reflect social drift; the recorded quintile may not reflect the original socio-economic status of all participants.

While price remains a substantial factor influencing drink choice amongst the heaviest drinkers, our findings stress the importance of not viewing alcohol as a single commodity. Environmental (the proximity and number of alcohol outlets) and personal factors cannot be ignored as these too influence choice of drink type. Heavy drinkers are astute, skilled and flexible shoppers.

Author statements

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Ethical approval

All participants gave written informed consent to participate in the study. Study documentation was approved by NHS Lothian Research Ethics Committee (Ref 08/S1101/9).

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Competing interests

Professor Chick is Medical Director, Castle Craig Hospital, Scotland; Advisor: Alcoholics Anonymous UK, H. Lundbeck A/S, Drinkaware Trust, Institute for Alcohol Studies.

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